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The numbers given by Alsop (528, 5796, 6325) are much larger, and same as found by Bonnycastle in his Introduction to Algebra published in London more than 100 years ago.

For other solutions, see *Mathematical Magazine*, Vol. II, No. 11 (Dec., 1898), pp. 214-16; also, the *Normal Monthly*, Vol. III, No. 10 (Millersville, Pa., June, 1876), p. 119.

Also solved by C. E. GITHENS.

MISCELLANEOUS QUESTIONS.

EDITED BY R. D. CARMICHAEL.

QUESTION.

11. In our courses of study is it desirable to give more consideration to vector analysis? What topics should be included in a first treatment of this subject?

REPLY.

6. In what ways and to what extent will the teaching of mathematics and the content of the curriculum probably be affected by the increasing demand for vocational training?

I. REMARKS BY W. T. STRATTON, Kansas State Agricultural College, Manhattan, Kansas.

There is a demand today for the practical in education. Every subject that is to remain in our curriculum must do so by showing that it has a real place in the lives of the people. The demand for vocational training will affect both the teaching of mathematics and the content of the curriculum to a very marked degree.

Every new teacher in our high schools has a tendency to teach the topics that were taught to him, and in the same way as he was instructed. Only the unusual man will break away from this practice. So the change in teaching and the vocational attitude toward the subject must find a place in the colleges and universities before they will permeate into all the schools. As long as the former turn out men and women grounded in the belief that the chief reason for the study of mathematics is in its disciplinary value for the intellect the high schools will in general follow the old traditional course. The change in teaching, it seems to me, will come principally from a change of attitude of the teachers toward the subject. The teachers will come to look upon the subject from the social point of view, that is, they will not only teach the mathematical computations and methods of argumentation, but they will also give the subject a social setting; they will show to the students the place in society at which the particular topic under consideration has its direct applications.

The kind of training college men and women have had in the past has not fitted them for work in the vocational schools. Until the normal schools and colleges give vocational subjects, and train the teachers from the vocational point of view, nothing but poorly taught vocational mathematics can be expected in the high schools. I do not mean that the class room instruction will be essentially changed, but that there will be a closer correlation of the mathematics

work with that of the other departments, and that the pupils will be brought into contact with real problems and not the mere statements of problems. Nor do I believe that it will ever be practicable in high school mathematics for teachers to take their classes into the laboratories or workshops and there work on a series of experiments so planned as to present the problems which the pupils will then be required to solve. It appears that there are many possibilities along this line that have never been realized, but it does not seem that one of the chief aims in mathematical instruction can best be served in this way. Mathematics consists of a system of knowledge which demands logical thinking for its mastery; and the number and variety of problems that will come up in this laboratory work will not be great enough to give the requisite experience in thinking.

The advent of vocational training into the secondary schools will probably bring about a closer study of the needs of the pupils. They will not be required to take a year and a half of algebra and a course in plane and solid geometry irrespective of the length of time they will likely spend in school or of the vocations for which they are preparing. Efforts are being put forth to make the courses such that if it becomes necessary for the pupils to leave school at the close of any term their work in mathematics will be of such a nature as to be of value to them. The amount and the character of the mathematics for students who are expecting to attend college will likely not be lessened. In the larger industrial centers the tendency will be to widen the scope of subjects, that is, along with the traditional algebra and geometry the most practical parts of trigonometry and a course in applied mathematics summarizing and vitalizing the subjects learned will make up the course. In the agricultural high schools the course in mathematics will likely be shortened and a course in applied arithmetic and courses in algebra and geometry, which emphasize the most practical phases of interest to the farmer, will replace the present courses. The course for the girls in the different schools will also probably be shortened, and the subjects of arithmetic, algebra, and geometry will be treated along with the applications of a kind that will be of most interest and value to them.

The high school in all its courses will probably give more consideration to the special needs of the pupils than to their preparation for college. The colleges will require fifteen units of work with very few limitations. Thus the small schools will be free to offer courses best fitted for the students in their particular localities and at the same time give the training requisite for admission to college.

NOTES AND NEWS.

UNDER THE DIRECTION OF FLORIAN CAJORI.

In H. Weber's *Kleines Lehrbuch der Algebra*, 1912, the same proof of the simplicity of the alternating group of degree n , $n \neq 4$, appears twice, on pages 215 and 373 respectively.